Anatomy Lesson: A Poem

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The Skin

My mother taught Health,
in high school, in the early sixties.
Her question was:
What are the three functions of the skin?
The student wrote:
To keep the water out and the blood and guts in.

The largest and heaviest organ,
20lbs, 14--22 square feet of gut and blood and rain control.
She gave her partial credit.

In one square inch of skin:

9 feet of blood vessels	600 pain sensors
9000 nerve endings	12 feet of nerve fibers
sometimes a tattoo	632 million bacteria
75 pressure sensors	sometimes a kiss

Koala bears have fingerprints so human-like that if someone were murdered
in the koala cage…
well, you can see how there might by trouble.

We shed too. 105 lbs. of divested skin by the time we hit 70.
So, the next time you lie on the rug in front of the television,
consider that 90% of floor dust consists of dead skin.

There are many interesting facts about us.

Here, however, is one of the most important:
There are 45 miles of nerves in your skin.
60,00 miles of blood vessels in you.
There is no map.
Only the traveling will teach you who you are
and what country you live in.

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Bones

Babies are born without kneecaps.
The funny bone is a nerve, not a bone.
The mineral content of our bones is almost indistinguishable

from a species of South Sea coral.

We have 208 bones:

Hands:	54
Feet:	52
Skull:	22
Ears:	6
Other:	74

The smallest: the ear's stirrup bone
The largest: the femur

The thighbone, the femur, has the bearing strength & pressure tolerance
of a rod of cast steel, is stronger than concrete,
and can support 30 times the weight of a man.
can tolerate 600 pounds of vertical force.

This burly bone is as hollow as dove's wing.

More on the hollowness later.

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Muscles

You've probably heard this one:
It takes more muscles to frown than it does to smile.

It's true. 43 to 17. Hardly a fair contest at all.

Here's what's frightening though—
every 2000 frowns whittles one wrinkle.

We are over 600 muscles.
Simply walking uses 200 of them. Speaking, 72.

And once you die,
and before rigor mortis captures your complete attention,
your muscles can contract and curl your body
on to its side like a salted slug.

Death is not pretty.

Another 200 muscles are used just to blink.
In focusing, eye muscles move 100,000 times in a single day.

Imagine speeding down a dark highway for a thousand miles,

a swollen moon hanging behind winter-stripped birch,
its face flashing like the white of an eye.
All day this flickering.

But the strongest muscle is the tongue.

Without it we cannot tunnel, excavate, burrow,
plow, rake, till, hoe.
We need this spade, this crowbar, this hammer, this silver spoon of lust.

And on the day man invented the knife,
he dreamt he hollowed out his enemy's mouth.

Removed that adept tool of taste and worship and heresy.
That exquisite instrument of adoration.

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Energy: Input/Output

A single one-minute kiss burns 26 calories.
Think about your last good kiss and do the math.
Now eat a piece of candy.

Banging your head against a wall for a solid hour
will burn only 150 calories.
This is not an advisable aerobic activity.

If you could plug it in,
the human body could throw off the heat
of a 40 watt bulb,
enough light to read poetry by.

In your lifetime you will consume:
50 tons of food and 16,000 gallons of fluids.
If you are from the south you may add 2,000 extra gallons
for sweet tea and bourbon.

You will also consume certain other things,
880 chickens and
8 spiders, for example.

Without food, it takes weeks for the body to die.
Without sleep, death comes in 10 days.

If you manage to kiss the whole time you are going without
food or sleep, death will come much more quickly and painlessly.

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Organs and Glands

Here is some of what they can remove and still leave you alive:

the stomach	1 kidney	the uterus
the appendix	the spleen	80% of your intestine
1 lung	the bladder	the prostate
80% of the liver	the ovaries	the gall bladder

Note the liver,
glandular purveyor of over 500 functions, will happily recreate itself—
slip into its letterman's jacket,
work out for a couple of months,
make that 3lb. football-sized mass
a real player, a mirror of its former self,
a bloody, quivering doppelganger
shown back up to take a lick'n in the forth quarter.

As well, some can do without that little bit of connective tissue t
hey caress in a lobotomy
and any number of limbs….

This is the neighborhood we live in—
the clammy cul-de-sac of the heart
whose neighbors rent.

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Elements and Ingredients

When it comes, (and it will),
that you consider your relative worth:
Do not think of the $25 your copper, calcium, & cobalt would fetch.
Do not calculate that your last kiss burned only 14 calories.
Do not think on the hollow places inside of you.

Think only that you are talented enough to mimic a general store,
with enough:
sulfur to kill all fleas on an average dog,
carbon for 900 No.2 pencils,
potassium to fire a toy cannon,
fat to make 7 bars of soap,
phosphorus to make 2,200 match heads,
water to fill a ten-gallon fish tank, and
enough iron to make a 3-inch nail.

Try to remember as well,
that smart people have more zinc in their hair,
& that the hydrochloric acid in your stomach
could easily eat through the hood of a Buick.

Remember your body will never forget.

Remember also you are the only animal in the world that can weep.

This is potentially more important than the opposable thumb.

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Cells

You are about 75 trillion cells. Each cell of you has 10,000 times
as many molecules as there are stars in the Milky Way.

The largest cell? The ovum.
The smallest? Yep, the sperm.

As you considered that fact, 50,000 cells perished and were replaced.

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Matter

Concerning those troublesome hollow spaces inside of you…

If they were to be removed—
If all your atoms voluntarily gave up
all of the space between all their nuclei—
If all the stars in your body rubbed shoulders,
knelt down together in prayer—

You would hardly be half the size of a flea.

End Notes

I began this poem where it ends—with my unending interest in the empty spaces, not only inside of us, but across the universe..One of my favorite poems is Frost's "Desert Places," which concludes, "They cannot scare me with their empty spaces / Between stars—on stars where no human race is./ I have it in me so much nearer home / To scare myself with my own desert places." It is from this space that this poem was born.

All numbers and information cited in this poem are as accurate and specific as I could make them. However, like most things in life and in this poem, specific numbers vary between individuals and are occasionally a matter of some debate. All errors contained within are my own.

*** Skin**

This organ includes nails and hair. Skin details in the above poem, i.e. weight, kisses and nerve endings noted per square inch, are the most frequently cited numbers. Some numbers are more agreed upon; some however have wide variations—such as the amount of skin shed over a lifetime ranges from 40lbs to over 100 lbs.

Koala bears, as well as gorillas and chimpanzees, also have unique fingerprints. However, the koala has ridge details—pattern, size and shape—that are so extraordinarily similar to a human's that even under an electron microscope it takes a very well-trained eye to tell the difference. While the entire human palm has ridges, the koala has ridges only on parts of the palm and on its fingertips. They also have two handy opposable thumbs on each hand.

Concerning the countries we live in, it is worth considering that we share 98.4% of our DNA with chimps. But we also share 70% of our DNA with a slug. It is also worth considering that newborns will utter virtually every sound necessary for every known language. Once our brain determines the language of its land, it engages in neural pruning, thereby permanently eliminating our ability to make certain sounds.

***Bones**

Some count the body as having 206 bones, however, the count of 208 considers the sternum to be made up of three bones instead of one; manubrium, body of sternum (gladiolus) and xiphoid process. Anatomical variations may also result in the formation of more or less bones. Common additional bones include cervical ribs or a lumbar vertebra.

As to the hollowness of the femur—the hollow space is slight and clearly not designed for flight but as an efficient cylindrical structure designed to confront bending stress. As well, the hollow space, the medullary cavity, isn't exactly hollow, but filled with red or yellow marrow with the clavicle as the only long bone without a medullary cavity.

Common knowledge holds that the hollow, marrow-free, air and strut-filled bones of birds makes them light enough for flight. Interestingly however, birds (or any flying creature) has, pound for pound, relatively the same ratio of skeletal weight to total body weight as any other animal. Recent studies have begun to prove that bird bones are not delicate things we have imagined them to be, but are denser, rounder and much stronger and stiffer than they appear in order to control for the physical stress of flight.[1]

[1] Dumont, E. R. (2010). Bone density and the lightweight skeletons of birds. Proceedings of the Royal Society B, 277, 2193-2198.

***Muscles**

While certainly tremendously forceful, due to its elasticity and forcefulness the tongue (actually numerous muscles and muscle groups) is generally considered the strongest "muscle," if only by a generally held consensus or practice.

In actuality, there are 3 varieties of muscle: cardiac, smooth and skeletal and the measure of their strength is determined in various ways. There is absolute strength (maximum force), dynamic strength (repeated motions), elastic strength (exert force quickly), and strength endurance (withstand fatigue). Strength is physiological (muscle size), neurological (how strong or weak), and mechanical (muscle's force angle). Therefore, measurement is a somewhat subject determination. Clearly the heart itself executes the leading quantity of physical work over a lifetime as it manages to beat about 100,000 per day. However, if strength refers to the force exerted, the strongest muscles are those with the greatest cross-sectional area—usually said to be the quadriceps femoris or the gluteus maximus.

As muscular strength generally refers to the ability to exert a force on an external object—the masseter or jaw muscle could be considered strongest based on size and bite strength. And as such shorter muscles are stronger, pound for pound the myometrial layer of the uterus may also be the strongest muscle by weight. During childbirth it can exert tremendous downward force with each contraction. As well, external eye muscles are much larger and stronger relative to the size and weight of the eyeball than is necessary and perform high-speed maneuvers. Such categorization would also include the soleus, found below the gastrocnemius (calf muscle) is also in the running as it, along with calf muscles, pulls against the force of gravity to keep the entire body upright. Clearly, the strongest muscle is a debatable concept.

Blinking. We blink about 25 times a minute. If we are reading we may blink 4 or 5 times a minute, but in conversation 29 times.

*** Energy: Input/Output**

Certain activities, such as rowing or running, have more stable and well-studied numbers. Things like kissing vary wildly, from 2 to 25 calories a minute. Ten minutes, twice a day could easily net 100 burned calories a day. Oral sex, masturbation, intercourse, orgasm, all burn various amounts of calories depending on the vigor and intensity one employs. All in all though, not a bad deal no matter what number one looks at.

Amount of food eaten over the course of a lifetime varies significantly and is quite dependent on culture, country and wealth. As is, sadly, the amount of food wasted. Numbers noted here generally reflect those of the average American.

Sleep and food and death here also represent averages. There are also certain rare medical conditions, such as Morvan's syndrome and Fatal Familial Insomnia, which fall outside these norms.

Some "records" of going without sleep for longer more extended period of time may not take into account the "microsleep" of certain altered states of consciousness, etc. The time varies as well before mania sets in. The world record of 11 days was set by a 17-year-old in 1964. (And yes, there are debates too about this record). But it is so dangerous to go for prolonged periods without sleep it is worth noting The Guinness Book of World Records will no longer acknowledge these records and sleep deprivation has been, and continues to be, used as a form of torture.

And what of those poor, continually studied and cited rats? They can manage about two weeks.

*** Organs and Glands**

The liver is amazing in its ability to rebuild itself. Our entire bodies are like little body shops, constantly repairing and refurbishing ourselves. And, much to the joy of dentists everywhere, our teeth are the only part of us we cannot repair.

While Aristotle believed we thought with our hearts and the brain's function was to simply cool the heart down, Descartes declared the brain machine-like in its functions. In the Middle Ages, the Catholic church banned human dissection and slowed even further our sluggish acquisition of brain (and body) knowledge. Even now we still know more about the universe without than we do the universe within. But, we do know the brain is 75% water and has the consistency of tofu and has about 100 billion neurons—perhaps as many cells as there are stars in the Milky Way. It is also the largest and most powerful sex organ.

As to lobotomies, they have always been around. Even in the dark Middle Ages, and despite the church's ban on surgery, there were always barbers willing to work their knives upon the brain to "remove the stone of madness."

*** Elements and Ingredients**

The worth of your body is relative. We can sell our hair, blood, saliva, breast milk, eggs and sperm. The body itself can be sold for sex repeatedly for various amounts. There is an entire fetish market you can explore should you so desire. At death, a disarticulated body could be broken into tissues or parts and on the open market be worth a quarter of a million dollars. Skin and base elements range anywhere from $1 to about $10 depending on the prevailing market prices.

As to weeping. Tear production, lachrimation, is necessary to clean and moisten the cornea, as well at to protect it with tears rich in nutrients and anti-bacterial properties. So powerful are tears that throughout history, humans have collected their tears in small tear bottles, Lachrymatory (or Lacrymatory) and were especially popular with the Greeks, Romans, Egyptians and enjoyed a resurgence in the nineteenth century Victorian age. Most agree humans are the single animal capable of producing emotional tears, that is, weeping.

Some research, like a 2001 University of Iowa study, concluded the ultrasonic "distress vocalization" of young rats was simply an "acoustic by-product of the abdominal compression reaction [… resulting] in increased venous return to the heart."[2] Basically they posited their crying was "analogous to a sneeze" due to a significant decrease in blood flow—not because they were cold and wanted their mothers. A 2005 study contended it was the neural system that mediated such crying in rats. [3]

Despite such diverse theories, there is almost certainly an evolutionary function of communication inherent in certain physiological expressions. Chimpanzees clearly become, "emotional" at being weaned, or losing sight of their mothers, or a brother, or at any number of seemingly significant events. Young Marmoset monkeys cry to get attention, to be carried, and infant rats cry. As well, as Frey (1981) proved, emotional tears differ in chemical composition from other tears. [4] Emotional tears contain more protein-based hormones, prolactin, and leucine encephalin (a natural pain killer) and result in making us feel better. And slicing onions won't fool your body.

While it may be true we are only animals that can, strictly speaking, weep, we are certainly not the only ones that can grieve. A dolphin will carry its dead calf with it for days, as will a chimpanzee or gorilla. The wailing of bear cubs sounds remarkably like a baby's cries. Darwin (1872), in The Expression of the Emotions in Man and Animals, noted the handlers of the Indian elephants at the London Zoo claimed the elephants "shed tears of sorrow." [5] Indeed, the sad keening of baby elephants sounds so much like weeping it could break your heart.

We are also the only blushers.

*** Cells**

The number of cells in the human body, of course, a topic for debate as well. Some sources say 10 trillion, some 50, some more. Most reputable sources place the number somewhere between 60-90 trillion. There are so many cells that if you lined them up end to end they could circle the earth 4 to 5 times. Cells are enclosed within a plasma membrane and are charged with different jobs, ranging from oxygen transportation to battling bacteria and viruses, to converting the sun's energy and transmitting signals. There are hundreds of jobs for your cells and they have easily earned the name Organelles, Latin for little organs.

*** Matter**

What does matter and not-matter matter? It matters most of all.

BIOGRAPHY

Salita S. Bryant holds a Ph.D. in literature, an M.Ed. in Clinical Counseling, and an MFA in poetry. She is Assistant Professor of English at Lehman College and author of *Addie Bundren is Dead.* She has won The Midwest Writing Center's *Off Channel* Contest, Connecticut Poetry Society's Award, *Boulevard's* Emerging Poet's Award, *Spoon River Poetry Review* Editors' Prize, *Iron Horse* Discovered Voices and nominated for three Pushcarts. She has published in *Alimentum, The South Carolina Review, Agenda, Nimrod, Snake Nation Review, Third Coast, Dogwood,* and *The North American Review,* among others. She lives in NYC and is a psychoanalytic candidate with Harlem Family Institute.

[2] Blumberg, M. S., Knoot, T. G., & Kirby, R. F. (2001) Neural and hormonal control of arterial pressure during thermal challenge in unanesthetized infant rats. American Journal of Physiology, 281, R1514-R1521.

[3] Krall CM, Andicochea CT, McDougall SA (2005) Ultrasonic vocalization production of preweanling rats: Effects of central and peripheral administration of €2-adrenoceptor agonists. European Journal of Pharmacology 517:200-207.

[4] Frey WH 2nd, DeSota-Johnson D, Hoffman C, McCall JT., "Effect of stimulus on the chemical composition of human tears," American Journal of Ophthalmology, 92:559-567, 1981.

[5] Darwin C, Ekman P, Prodger P. (1998) The Expression of the Emotions in Man and Animals, 3rd edn, London: Harper Collins. (Original work 1872).